Abstracts

SELECTED PAPERS

PEST MANAGEMENT AND RISK (James Epperson, University of Georgia).

"An Economic Evaluation of a Multi-Crop Pest Management Program." Jerry E. Hatcher, Michael E. Wetzstein, and G. Keith Douce, University of Georgia.

Seemingly unrelated regression is employed to provide one of the first attempts to comprehensively evaluate a multi-crop Integrated Pest Management (IPM) program. IPM participation indexes constructed by factor analysis are also employed. Results of this investigation, although inconsistent with previous research, are consistent with producers' employment of IPM practices.

"Integrated Pest Management Strategies for Control of Corn Rootworm and Soybean Cyst Nematode." Thomas P. Zacharias, Louisiana State University; and Arthur H. Grube, University of Illinois.

A stochastic dynamic programming model is used to determine optimal integrated pest management strategies for control of corn rootworm and soybean cyst nematode. Management alternatives include use of chemical pesticides, nematode-resistant soybean cultivars, rotation to nonhost crops, and nontreatment in the presence of low pest infestations. State variables in the model are pest infestation levels, previous land use, and expected product prices. Results indicated that for land previously in soybeans, use of untreated corn was the dominant strategy. For land previously in corn, the optimal decision rule was fairly sensitive to the remaining state variables in the system.

"Combining Sample and Other Information to Enrich Pest Management Analysis." Philip Szmedra and Michael E. Wetzstein, University of Georgia, Athens; and James Todd, University of Georgia, Tifton.

In integrated pest management (IPM) research, investigators are often confronted with the problem of a limited quantity of quality data. In this study, a method to enrich prospective IPM data sets is proposed by pooling sample data originating from different experimental designs. This type of analysis is required for any investigation of economic thresholds since the procedure will indicate if the various restrictions associated with pooling conform to the data sets.

"A Test of the Effectiveness of the Mean-Variance (E-V) Criterion." Donald W. Reid and Bernard V. Tew, University of Kentucky.

The expected value-variance (E-V) criterion has received much criticism because the underlying utility function and activity distribution assumptions appear too restrictive. Using several utility functions and nonnormally distributed activities, the expected utility of various portfolios was compared to the expected utility of the E-V efficient portfolios. The E-V criterion resulted in portfolios that maximized expected utility irrespective of the decisionmaker's utility function and the activity distributions.

"The Relative Effectiveness of TSD, DSD, and Stochastic Dominance with Respect to a Function as Methods for Analyzing Alternative Crop Varieties." Margaret Flood, Federal Crop Insurance Corporation; and Francis McClamley and Kenneth Schneeberger, University of Missouri-Columbia.

This paper compares the relative effectiveness of third degree stochastic dominance (TSD), decreasing absolute risk-aversion stochastic dominance (DSD) and generalized stochastic dominance (GSD) in ordering alternative soybean and wheat varieties. TSD and DSD were marginally effective in ordering SSD and TSD efficient varieties, respectively. The effectiveness of the GSD criterion depended upon the risk aversion coefficient interval. When used with the risk aversion coefficient interval suggested by Wilson and Eidman, it was generally less effective than TSD or DSD. With the narrower Kramer-Pope risk aversion coefficient interval, GSD was the most effective method.

COMMODITY FUTURES MARKETS (Bill Herndon, Mississippi State University).

"A Survey of World Trade Interest in a Futures Contract for Edible Peanuts." Bill R. Miller, Brian J. Smith, and F. W. Williams, University of Georgia.

Establishment of a futures contract in shelled edible peanuts on a major commodity

exchange in the United States, London or Rotterdam might succeed under any scenario that includes increasing price risk. Possible sources of price risk are increased production for export, domestic price levels above loan support, or the abandonment of support prices. A sample of export traders in the world market (62 percent of world trade) and a sample of importers (58 percent of world trade) indicated that under current market conditions there would be an estimated trade volume of 82 thousand futures contracts (20 metric tons per contract) per year. Speculators were estimated to increase trade volume to the range of 107-530 thousand contracts depending on assumptions about speculator interest.

"An Analysis of Cross-Hedging Carcass Beef to Reduce the Short-Term Price Risk of Meat Packers." DeeVon Bailey, Utah State University; and B. Wade Brorsen, Purdue University.

Hedging in the live cattle futures market has largely been viewed as a method of reducing producers' price risk over a rather lengthy production period (3 to 6 months). Meat packers and processors also face price risk. However, packers' and processors' price risks lie on the upside and are also relatively short-term (usually a few days). The possibility of reducing packers' and processors' price risks through long cross-hedging on the live cattle contract for a short period of time (1 week) was investigated.

"Price Discovery Processes in the Cattle Complex: An Analysis of Lead/Lag Relationships Between Cash and Futures Prices." Michael A. Hudson, University of Illinois; and Wayne D. Purcell, Virginia Polytechnic Institute and State University.

Price discovery processes in the cattle complex are examined via analysis of lead/lag relationships between cash slaughter steer prices, cash carcass beef prices, and live cattle futures prices. Cash slaughter steer prices are shown to interact within the day with both live cattle futures prices and cash carcass beef prices. Live cattle futures prices lead cash carcass beef prices, but are not dominant in price discovery since there is evidence of intraday movement between the two series. The results suggest that live cattle futures play an important, but not dominant, role in price discovery in the cattle complex.

"The Performance of Soybean Futures Markets in Establishing Forward Prices." Mack N. Leath, University of Illinois.

The forward-pricing function of the futures market has increased in importance as supply, demand, and price have become more variable in recent years. This article examines the relative performance of alternative futures contracts for soybeans in forward-pricing, and contrasts the market's performance in periods of stability and instability. The results indicate that performance has improved over time and was superior in the period when prices were more variable.

"A New Procedure for Evaluating the Forecasting Efficiency of the Futures Market." Edward O. Fryar, Jr., Emmett W. Elam, Oscar P. Bonifaz, and Mark J. Cochran, University of Arkansas.

A Bayesian procedure was used to evaluate the forecasting efficiency of the futures market. This procedure calculates the degree of support which the data provide for the idea that the market is efficient in contrast to the t-test which is designed to calculate the level of support for the notion that the market is not efficient. In addition to allowing the researcher to evaluate the forecasting efficiency of the market, the researcher has the ability to specify an acceptable level of precision for the forecast. This provides the researcher the opportunity to directly incorporate the cost of a potential error into the analysis by designating the precision of the evaluation. Based on the level of precision used in this study, the Bayesian procedure indicated that the futures market provides an efficient forecast of cash corn prices up to 8 weeks ahead. For forecasts beyond 8 weeks, it cannot be argued that the futures market provides an efficient forecast.

LAND ECONOMICS: ALLOCATION AND VALUE (William E. Hardy, Auburn University).

"Estimating Acreage Allocation in Agriculture: The Case of U.S. Feed and Food Grains." Chandra M. Shrestha and David L. Debertin, University of Kentucky.

This paper estimates acreage allocation functions for six feed and food grains in the United States. A general theory of acreage allocation is developed. The issue of simul-

taneity or jointness in acreage allocation is addressed. Based on this, a theoretically correct simultaneous equation approach is used in estimating the acreage allocation functions. Results indicate that this approach yields reasonable parameter estimates without involving undue estimation costs. Some of the important relationships are demonstrated more clearly by these results than by the results obtained from previous studies. This theoretically plausible approach is found promising.

"Regional Differences in Acreage Response for Major U.S. Field Crops." James A. Langley, ERS, USDA.

This study investigates regional differences in planted acreage response to market and government policy incentives over the 1960-80 period. Acreage response functions are estimated and elasticities are compared for eight principal field crops produced in 10 separate regions. Significant regional differences in acreage response are found to exist, with the response of crops which have a relative regional comparative advantage tending to be more inelastic.

"Determinants of Land Prices and Acreage in Florida's Citrus Producing Region." Rodney L. Clouser and Jay W. Yingling, University of Florida.

Many reasons have been offered for the decline in citrus acreage in Florida such as increased imports, increased production costs, weather, and population increases. The intent of this study was to determine economic and socio-economic variables that influence land prices and citrus acreage in a selected region of Florida. Results of the study indicate that land prices are influenced by location relative to a major city, commercial development and restricted land use. The change in citrus acreage was influenced by the price of land, net returns and weather.

"Using Economic Theory to Model Farmland Prices." Valerie Will, Jerry Skees, and Michael Reed, University of Kentucky.

The purpose of this paper was to compare and contrast two models used to estimate land values. The first model was based on rigorous economic theory using a capitalization model. The second was a loosely developed model without any theoretical underpinnings. Data involved both parcel specific characteristics as well as market variables, i.e., interest rates, an inflation index and average rents. Both models were statistically sound with the former providing estimates of rents and the latter providing the capitalized values of these variables as reflected in agricultural land values.

"An Examination of Alternative Functional Forms in Farmland Price Modeling." Gordon L. Carriker, Clemson University; and Charles E. Curtis and Bruce B. Johnson, University of Nebraska.

The functional form of the size-price relationship in a per acre land price model is explored. Theoretical implications of the various forms are presented with attention given to the resultant total-tract price functions. A quadratic form model, suggested to be the preferred model, was then applied to a Nebraska farmland market.

USING COMPUTERS IN TEACHING, EXTENSION, AND RESEARCH (Marty Fuller, Mississippi State University).

"A Survey of Farm Management Texts: Pre-World War I to Present." Robert M. Finley, University of Missouri.

Farm management is an integral part of almost all agricultural college curricula. This was not always the case. The purpose of this paper is to examine and compare the contents of major farm management texts from 1913 to present under the assumption that a comparison of texts should reflect trends in farm management teaching. The structure of agriculture, of course, evolved over the 70 years, and it is fair to say the emphasis of farm management teaching has changed even more. Financial management appears to be the primary focus in most recent books in farm management.

"Integration of Production Theory Into the Practice of Farm Management: An Analysis of Selected Textbooks." Francis M. Epplin, Oklahoma State University.

A solid theoretical base is contained in many of the current farm management textbooks. However, successful integration of the principles of production economics with the practice of farm management is lacking. Many examples in current textbooks rely upon hypothetical cases and may confuse rather than

enlighten readers. The tools of budgeting are often isolated from the material contained in theory chapters. It is suggested that the tool of partial budgeting be utilized to provide the base for molding potential farm managers into the economic way of thinking about resource allocation and use.

"MPS-PC: A Microcomputer Linear Programming System for Teaching and Research." George H. Pfeiffer, University of Nebraska.

Microcomputers offer the prospect of being a major technological advancement in the way that research and classroom instruction are conducted. This paper discusses development of an LP software system and its use in research and teaching. Developmental difficulties are discussed and the system is described. Student reaction to use of the program in the classroom and its utilization as a research tool are presented.

"Teaching Futures Market Principles with a Microcomputer Simulation Game." James N. Trapp, Oklahoma State University; and John E. Ikerd, University of Georgia.

A microcomputer simulation game was developed which realistically simulates cash and futures market prices and basis patterns. The game uses a random walk price generation process; hence, each simulation run is unique. Players can make cash, futures, and options markets transactions. The consequences of the player's decisions are calculated and displayed by the game. The primary teaching benefit of the game is its dynamism and realism. Players can watch market situations and the results of their decisions unfold day-by-day. Through the game, the player can experience years of realistic market situations in minutes.

"Learning with Microcomputers." Harold Cochrane and Neilson Conklin, Colorado State University.

While universities are instituting computer literacy requirements and purchasing microcomputers, agricultural economists have not devoted much effort to developing new ways of incorporating this technology into the core curriculum. In this paper, the philosophy of using microcomputers as a teaching tool is discussed and specific examples of teaching material prepared for courses in macroeconomics and agricultural price analysis are presented.

The approach to teaching used with microcomputers emphasized use of the electronic spreadsheet models and "role playing" by students. Using these models, students discover algorithms for solving economic problems.

SOIL LOSS AND CONSERVATION ISSUES (Steve Henning, Louisiana State University).

"The Influence of Probabilistic Constraints on Soil Erosion Control Analysis." Eduardo Segarra, Randall A. Kramer and Daniel B. Taylor, Virginia Polytechnic Institute and State University.

This paper shows the effects of taking into account the probability distribution of soil loss, rather than just its mean value in farm planning models. A disaggregated approach was used because of an interest in evaluating the impact of alternative soil conservation policies on farm-level decisionmaking. A linear programming model which considers different levels of probability of soil loss was used. It is shown that profits are consistently overestimated at low levels of probabilities of soil loss subject to satisfying different constrained levels of erosion.

"The Economics of Soil Heterogeneity and Implications for Soil Conservation." William Y. Davis and Steven E. Kraft, Southern Illinois University.

The complex nature of soil as a resource is comprised of both stock and flow dimensions. Using Lackman's morphological theory of capital and Gaffney's four economic aspects of soil, it is shown how qualitative and quantitative changes in soil due to erosion can be evaluated using McInerney's model for destructible regenerative natural resources. The model is used to show the impact on the optimum levels of resource use in present and future periods resulting from: (1) changes in the rate of resource regeneration, (2) internalization of external costs associated with soil erosion, and (3). imposition of penalties for failing to engage in actions to conserve the soil.

"The Effects of Yield Variance on Soil Conservation Incentives." David E. McElyea and Lee A. Christensen, University of Georgia.

Models are developed for estimating the relationship between topsoil depth and yield and incorporating changes in both average yield and yield variance in the estimation of the value of investments in soil conservation practices. These models are applied to soybean production on a Georgia soil. Results and policy implications are presented.

"A Case Study of the Effectiveness of Subsidies and Taxes in Controlling Soil Erosion and Stream Pollution." J. W. Hubbard and E. H. Kaiser, Clemson University; and R. D. Seale, Mississippi State University.

A farm enterprise budget generator, a hydrologic model, and a matrix generator were used to specify a linear programming model of a particular watershed. This model was used to analyze the effects of subsidies on minimum tillage production system, taxes on conventional tillage production systems, and regulations relative to stream sedimentation on production practices, farm incomes, and stream pollution. Results indicated that subsidies, taxes, and regulations could be used to reduce stream pollution. There would be large differences, however, among these approaches in the incidence of costs, stream pollution, soil loss, and farm incomes.

"Adverse Selection Problems in Federal Crop Insurance." Jerry R. Skees and Michael R. Reed, University of Kentucky.

Federal Crop Insurance policy is based on the assumption that the coefficient of variation on crop yields is independent of expected yield. This paper uses corn and soybean yield data for Illinois farms to test this assumption. The tests indicate that the coefficient of variation falls as expected yields increase. Further, the research illustrates the degree to which expected indemnity declines for farms with different higher expected yields.

ISSUES IN FACTOR PRODUCTIVITY AND ECONOMICS OF SCALE (John Brooker, University of Tennessee).

"Linkages Among Estimated Technological Parameters, Production, Supply and Input Demand Elasticities for Agricultural Production Functions." Angelos Pagoulatos and David L. Debertin, University of Kentucky.

Unbiased estimates of technological parameters of an underlying production function can be obtained by first estimating the cost share equations. From the parameter estimates of the cost share equations, it is possible to obtain all relevant elasticities, including production elasticities, own and cross input demand elasticities, the elasticity of input demand with respect to product price, and the output supply elasticities. The approach has important implications for, and represents a new way to estimate, aggregate supply elasticities.

"A Disaggregated Analysis of Demand for Specific Fertilizer Nutrients in the United States." Emanuel A. Gyawu and Larry D. Jones, University of Kentucky.

A disaggregated model of the demand for specific fertilizer nutrients is estimated using quarterly data from 1960 to 1980. Demand for all specific nutrients is inelastic with respect to own price and the farm price of corn, but elastic with respect to acreage planted. The derived elasticities provide policymakers with information on the effects of various government programs, such as payment-in-kind, on farm level demand for fertilizers.

"Grain Export Elevators: Economies of Size Analysis." Magid A. Dagher, University of Maryland; and Lynn W. Robbins, University of Kentucky.

The major findings which were obtained through application of the economic engineering approach are: (1) in the short run, handling costs declined continuously for all model elevators as grain volume handled was increased to the maximum volumes that could be handled, and (2) in the long run, diseconomies of size were evident for port elevators larger than 4 million bushels of storage capacity—the optimum sized port elevator. The foregoing results do not support the hypothesis of economies of size in port elevator operations. However, the evidence on economies of utilization suggests that substantial grain volumes can be handled at suboptimal elevators.

"Beyond (But Back to?) Returns to Scale and Size." John W. McClelland and Michael E. Wetzstein, University of Georgia, Athens; and Wesley N. Musser, Oregon State University.

The aim of this paper is to systematically reexamine the differences between the concepts of returns to size and returns to scale. Specifically, the relationship between returns to scale and size are examined through use of the envelope theorem. A major conclusion of the paper is that the level of abstraction in applying a cost function derived from a homogeneous production function within a relevant range of the expansion path may not be severe when compared to the theoretical estimative and computational advantages of homogeneous functions.

"Total Factor Productivity and the Elasticity of Scale: An Analysis of U.S. Agriculture." Robbin Shoemaker, ERS, USDA.

This paper discusses the effect of nonconstant returns to scale on estimates of total factor productivity (TFP). A parametric approach to TFP measurement is used requiring estimation of a translog cost function to derive estimates of the elasticity of scale. This is applied to U.S. agriculture with four variable (K,L,E,M) and one fixed input, land. Homotheticity is tested in this input procedure and is shown to have considerable impact on estimates of biased technical change. Own- and cross-price and substitution elasticities are estimated and discussed. The elasticity of scale is determined and is shown to indicate decreasing returns to scale for the farm sector. Finally, scale adjusted and unadjusted measures of TFP are simulated which demonstrate how decreasing (increasing) returns to scale overestimates (underestimates) TFP growth when constant returns to scale is assumed.

RESOURCE AND COMMUNITY DEVELOPMENT ISSUES (Nathaniel Brown, Jr., Fort Valley State College).

"An Integrated Software Approach for Assessing Economic Impacts of Foreign Pests." Luis F. Suguiyama and Walter L. Ferguson, ERS, USDA.

Each year, new occurrences of foreign pests that affect agricultural crops in the United States are detected by the U.S. Department of Agriculture. This paper demonstrates the use of an integrated software program to assess preliminary economic impacts of foreign pests to producers, consumers, and society in general. A partial budget analysis is used in which different economic scenarios are simulated by allowing changes in costs of production, yield, and prices for the affected crops. An illustrated case provides estimates of the potential economic impacts of an established population of medflies and five other tropical fruit flies.

"An Input-Output Analysis with Stochastic Parameters: Use of Nonnormal Deterministic Equivalents." Thomas R. Harris, University of Nevada; and Ambrose Goicoechea, George Mason University.

Interindustry analysis has been used by economists to estimate regional economic sector activity from changes in economic structure or final demands. These forecasts have used deterministic interindustry models with costly Monte Carlo simulation techniques to derive sectoral output levels. This study, however, develops a stochastic interindustry model where the probability distribution of interindustry parameters are other than normal. Using the stochastic interindustry model, researchers can derive the probability that the level of output for a specific economic sector will meet its demands from other economic sectors and final consumers.

"Short-Term Effects of Publicized Shellfish Contamination: The Case of Hard Clams." Oral Capps, Jr. and Leonard A. Shabman, Virginia Polytechnic Institute and State University; and John W. Brown, North Carolina State University.

Between May and September 1982, a series of gastroenteritis outbreaks occurred in upstate New York. The purpose of this paper was to estimate the short-run impacts of these outbreaks on wholesale and ex-vessel prices and revenues of hard clams. Using a simultaneous equation model of the price formation process for hard clams, it was concluded that wholesale and ex-vessel prices were affected by the gastroenteritis events and the resultant publicity. The estimate of the loss in total revenue to the hard clam industry at both the wholesale and ex-vessel levels over the period May to December 1982 was slightly more than $2.0 million. Roughly 65 percent of the total loss was from the dockside level, while the remaining 35 percent was from the wholesale level.

"Employment Multipliers for the Southeast Alaska Economy: A Differential Ex-

port-Base Analysis." Donald R. Andrews, Nicholls State University.

Fisheries resources are important in the economic development of southeast Alaska. The salmon fishery has historically accounted for over 70 percent of total fisheries value in this region. An export-base model was developed for estimating employment multipliers for this economy. Export-base analysis was selected due to this economy's dependence on export markets, particularly in the case of fisheries output.

Employment multipliers were estimated using ordinary least-squares regression techniques. Results from this analysis indicate that for every one person employed in the salmon fishery, 0.46 are employed in service industries. Multipliers were also estimated for other fishing (Halibut and other), fish processing, and non-fishery economic activity. In the peak salmon harvesting month (July), salmon fishing was responsible for a net employment impact (direct and indirect) of approximately 3,227 jobs.

"Application of Cluster Analysis for Developing a Typology of Regional Economic Growth." Lehi German, Farmland Industries; Curtis Braschler, University of Missouri; and John Kuehn, ERS, USDA.

The purpose of this study was to evaluate the suitability of a statistical clustering procedure for developing a typology of regional economic growth patterns. The key research objective was to group counties with homogeneous economic growth patterns using cluster analysis applied to industry sector employment and population data. County employment and population statistics for 1970 and 1980 census years represented the basic data used in the analysis.

The clustering procedure performed well in identifying a typology of different regional economic growth patterns. This conclusion was supported by the high R-square (0.83) achieved in the cluster analysis and distinct employment growth rates between clusters.

RISK AND RISK MANAGEMENT (David L. Debertin, University of Kentucky).

"Land Allocation Under Uncertainty with Unknown Distributions of Returns." Robert N. Collender, James A. Chalfant, and David Zilberman, University of California.

Economists have recommended mean-variance analysis for over a generation. However, the foundation of this analysis remains tenuous. Optimal land allocation decisions also depend on higher order moments of the profits distribution. In this paper, an optimal land allocation rule using moment-generating functions is presented which is independent of the nature of the underlying distribution and accounts for all moments. Both parametric and nonparametric moment-generating function techniques are described. These are applied to the choice between cotton and corn in the Mississippi Delta, demonstrating that ignoring higher order moments is not justified empirically, theoretically, and in terms of expected utility.

"Acreage Planting Decision Analysis of South Carolina Tomatoes: Nerlovian Versus Just Risk Model." T. T. Fu and J. E. Epperson, University of Georgia, Athens; and S. M. Fletcher, University of Georgia, Experiment.

The purpose of this paper was to determine factors which explain supply response behavior of South Carolina tomato growers. Two well known supply response models were used for comparison—the Nerlovian structural model and Just risk model. The Just risk model was shown to be superior in terms of goodness of fit in both stable and unstable periods. An evaluation of forecasting power between the two models was indeterminate. It was found that growers are apparently willing to invest in more information with increased market instability as growers were influenced by the Florida winter price of tomatoes in planning decisions during the period of instability.

"Futures Markets and Firm Decisions Under Price, Production, and Financial Uncertainty." Vickie J. Alexander, University of Georgia, Athens; Wesley N. Musser, Oregon State University; and George Mason, University of Georgia, Athens.

Marketing strategies, especially hedging, have received considerable attention for risk management. A mean-variance preference function is utilized to determine optimal sized futures contracts when the interaction of price, production, and financial risk is considered. This paper presents an E-V analysis

of cash, hedging, and speculative strategies for corn and soybeans in Georgia and Illinois. Speculative, but not hedging strategies, tend to be E-V efficient.

"Socio-Economic Variables and Risk: The Case of Small Commercial Farms in Louisiana." Roger Hinson, Robert Wharton, and Steve Kelly, Louisiana State University.

It is important for agricultural lenders to identify loans and individuals having high levels of risk. Lenders evaluate applications on the basis of financial data, but indicate that a "feeling" for an applicant's management ability is important. For a sample of small commercial vegetable farms, socioeconomic variables that contribute to or reflect management are evaluated in terms of relative importance and ability to predict risk levels. More education, acres owned, and farm experience were associated with individuals who were considered to be better risks. This procedure could be used to develop criteria to direct loans, encourage production of specific crops, or be generalized to other crops, areas, or disciplines.

"Farm Risks: Their Importance, Their Causes and Farmers' Responses." Kwabena A. Anaman and William G. Boggess, University of Florida; and Gregory D. Hanson, Auburn University.

Despite the contention that risk and uncertainty play an important role in agriculture in the Southeast, very little is known about producers' perceptions of risk. This paper describes the procedures used and the results obtained from a survey of farmers' perceptions of the importance of various sources of risk and alternative risk management practices. Initially, farmers were asked to define risk and then to rank various sources of risk and management responses to risk based on the relative importance of each to their operation. Summary statistics, Chi square analyses, and logit regression techniques were used to analyze the results.

AGRICULTURAL FINANCE: CREDIT ISSUES AND CAPITAL PRODUCTIVITY (James Richardson, Texas A & M University).

"Optimal Debt Financing for U.S. Agriculture." Syu-Jyun Larry Lyu and Fred C. White, University of Georgia, Athens.

How efficiently has the agricultural sector in aggregate utilized debt capital? This paper addresses this question by analyzing the use of debt relative to costs of alternative sources of capital. The study estimated the optimal equity-to-debt ratio in the agricultural sector through a dynamic value maximization framework. The parameters in the model were assumed to be time-varying in nature. A unique result of the analysis is empirical estimates of the marginal cost of equity through time.

"Measuring the Productivity of Capital Utilized by Farm Firms." Cole R. Gustafson, ERS, USDA.

The agricultural sector has operated in a period of high real interest rates for nearly half a decade. Some are concerned this has limited capital availability and stagnated the historic capital for labor substitution occurring in the sector. This study proposes new procedures for estimating the aggregate production function of U.S. agriculture. Improvements include incorporation of total returns and revised measures of capital inputs. Results indicate increasing capital productivity does not necessarily increase the wealth position of agricultural producers in a competitive environment.

"Regional Differences in the Formation of Farm Real Estate Debt." William G. Colclough, University of Wisconsin; and Mark D. Lange, Louisiana State University.

Rapid changes have taken place in the formation of farm real estate debt in the past 15 years. Since the early 1970's, no empirical estimates of factors influencing debt formation have appeared, and earlier papers used aggregate U.S. data. Strong regional differences in net farm income, farmland values, and farm sizes exist. Therefore, differing elasticities of debt formation to factors causing changes should exist across U.S. farming regions. Empirical evidence is reported to show statistically significant differences in elasticities of debt formation between northern and southern states.

"Analysis of Changing Market Shares of Major Farm Real Estate Lenders." Deborah B. Dallas and Fred C. White, University of Georgia.

Market shares of major farm real estate lenders have changed dramatically over the last 30 years. This paper explains why these

changes have occurred. Two approaches were used. The first approach compared market shares between two points in time. Factors identified as having the greatest impact on changing market shares were size of market and competitive effects. The second approach analyzed market shares within a demand framework, focusing on size of market and competitive effects. Coefficients for size of market variables were unchanged over time, but the demand relationships have recently become more elastic with respect to own interest rates.

"An Analysis of Agricultural Credit Programs and Technical Efficiency in Southeastern Minas Gerais, Brazil Under Alternative Stochastic Specifications of the Frontier Production Function." Timothy G. Taylor and J. Scott Shonkwiler, University of Florida.

The effect of subsidized credit on the technical efficiency of traditional farmers in Southeastern Brazil is analyzed under two alternative stochastic specifications for the production frontier. It was found that the choice of stochastic specification significantly influenced inferences regarding the effect of subsidized credit on measured technical efficiency.

DEMAND AND PRICE ANALYSIS (Gary Wells, Clemson University).

"Seasonality in Long-Run Advertising Elasticities for Fluid Milk: An Application of Smoothness Priors." Henry Kinnucan, Auburn University.

A Bayesian procedure known as "smoothness priors" is applied to the problem of estimating the seasonal structure of long-run advertising elasticities for fluid milk. Results suggest that the Bayesian approach does offer some advantages over the Ordinary Least Squares approach in terms of providing smaller standard errors and hence improved precision of the estimates. Existing tests, however, are not powerful enough to objectively discriminate among alternative restrictions that may be imposed via the smoothness methodology. Despite this limitation, smoothness priors appears to offer a viable tool for mitigating the effects of multicollinearity when estimating economic relationships from time series data.

"The Relationship Between Managerial Heuristics and Economics in Pricing Meats at Retail." Michael R. Reed and Lynn W. Robbins, University of Kentucky.

This study analyzes retail price decision-making in the food industry. Results indicate that the studied firm considers the draw and substitution impacts of price changes for individual products. The firm's pricing decisions were also found to be sensitive to price changes of competitor's prices in the short run. However, in the long run, the firm seemed to pay more attention to the movement of wholesale prices, rather than the competitor's prices.

"Subgroup Demand: An Application of the Dynamic Linear Expenditure System to a Fruit Juice/Drink Commodity Subgroup." Jonq-Ying Lee and Mark G. Brown, University of Florida.

A subgroup demand system for fruit juice/drink commodities is examined using the dynamic linear expenditure system allowing past consumption to impact on current consumption through stock variables capturing the effects of inventories and habits. Subgroup demand effects are compared with total demand system effects, the former ignoring all demand impacts in contrast to the latter, and habit effects are found to dominate inventory effects for the fruit juice/drink commodities.

"Estimating the Price of Quality Characteristics for Tomatoes: Aiding the Evaluation of the Postharvest System." Jeffrey L. Jordan, R. L. Shewfelt, S. E. Prussia and W. C. Hurst, University of Georgia.

An important aspect in the fresh tomato market is the array of quality characteristics that affect value. This paper estimates implicit prices for quality factors using a flexible functional form. Those quality characteristics of highest value and, thus, the stages in the postharvest system that most affect the price of tomatoes, can then be evaluated.

"Managing Demand Variability for Grade A Milk at the First-Handler Level." Marilyn G. Kletke and Leo V. Blakley, Oklahoma State University.

Pricing policies of cooperatives can influence market reserves, transportation costs and costs of processing surplus milk. A credit of $0.25 cents per hundredweight for uniform

purchases by first-level handlers was successful in reducing the variation in their demands. Variability of daily deliveries was reduced 6.5 percent in May and 13.5 percent in October. The standard deviations of deliveries over days of the month decreased by 45 percent in October and by 65 percent in May. Handler demands across days of the week varied by size of handler before the credit, but were not statistically different after the credit became effective.

COMMUNITY/AREA DEVELOPMENT ISSUES (Upton Hatch, Auburn University).

"Self-Evaluation of Home Food Supplies in Low-Income Households." David M. Smallwood and James R. Blaylock, ERS, USDA.

An ordered probit model is used to examine the relationship between food expenditures, socioeconomic characteristics, and a household's self-evaluation of home food supplies. Empirical results reveal that a household's characteristics and participation status in the food stamp program appear to have a strong relationship with the reported adequacy of one's home food supplies even after controlling for the level of per person food expenditures. Because self-evaluations are clearly subjective, they can be used to gain insights into factors affecting household perceptions concerning the adequacy of home food supplies.

"Estimation of Implicit Subsidies Resulting from FmHA Rural Water System Loans." Paul H. Gessaman, University of Nebraska.

Implicit subsidies attributable to below-market interest rates for FmHA rural water system loans under constant prices, and similar implicit subsidies attributable to the combined effects of below-market interest rates and two assumed levels of inflation were estimated. These estimates were compiled for 69 loans secured from FmHA by a representative sample of 26 rural water systems in five North Central States. The quarterly average interest rate on long term treasury bonds was used as the opportunity interest cost of these loans. Implicit subsidies were estimated in the accounting sense as the difference in total debt service claims on system revenues through the period of the respective 40-year loans, and as an economic cost calculated as the difference between the principal amounts of the loans and the net present value of the anticipated stream of debt service payments discounted at the applicable treasury bond rate (with and without inflation). Implicit subsidies estimated in the accounting sense were 118 percent of the principal amount of the subject loans. In the economic cost sense, they were 32 percent to nearly 60 percent of the principal amount of the subject loans.

"An Empirical Analysis of Food Stamp Program Effects in the Southern Subregions." Joyce Allen and Kenneth Gadson, ERS, USDA.

Food at home expenditures of low-income households in the three southern subregions were estimated using data from the 1979-80 USDA Survey of Food Consumption in Low-Income Households. The effects of the Food Stamp Program on food expenditures were examined through use of interaction terms. The results suggest that food stamps were most effective in raising food at home expenditures for larger households and least effective for households with higher incomes. Food stamps tended to have a stronger impact on non-white households and on metropolitan households. Some subregional differences were noted in the effects of the Food Stamp Program.

"A Regional Analysis of Physician Distribution in Nonmetro Areas During the Seventies." Mary Ahearn and Michelle Fryar, ERS, USDA.

The number of physicians per 100,000 population in nonmetro areas increased during the 1970s. However, nonmetro areas continued to experience a shortage relative to metro areas and that gap widened during the 1970s. There were 71 physicians per 100,000 population in the South in 1979—the lowest ratio of all regions. The most important factor associated with the distribution of both general practitioners and specialists in nonmetro areas is the availability of hospital beds in the county. Persistent low income areas which are concentrated in the South and thinly populated rural counties still experience low physician availability.

"Area-Wide Agricultural Water Modeling for Operational Management Under Administrative Allocation Systems." G. D. Lynne, University of Florida.

Administrative based water management institutions evolving in the eastern states, like Florida, have unique economic information requirements. These entities serve the allocative role of a water market. Modelers must address legal liability; flexibility in application to field, farm, and area-wide prediction; and who makes the water management decisions. A model to be used in an administrative setting must be continually updated and validated, implying substantial financial commitments. Economic analysts must be sensitive to the nature of the institutional setting in which models will be used to insure adoption by staff, and use by decisionmaking bodies.

INTERNATIONAL TRADE AND AGRICULTURAL POLICY ISSUES (Gene Mathia, IED/ERS/USDA).

"Implied Warranties and Moral Hazard in the Livestock Industry." Terence J. Centner and Michael E. Wetzstein, University of Georgia.

Implied warranties of animal health provide insurance coverage with no incentive for the buyers to minimize damages. This moral hazard led livestock buyers to seek legislative redress through a legislative exception which abrogated implied warranties of animal health. This paper shows that the legislative shift of liability for damages arising from breaches of implied warranties is not an optimal economic solution since it fails to respond to the market inefficiency created by moral hazard.

"The Effect of U.S. Sugar Policy on Domestic Sugar and High Fructose Corn Syrup Markets." James W. Dunn and Harry L. Vroomen, The Pennsylvania State University; and Kenneth F. Harling, University of Guelph.

An econometric model of the domestic sugar and high fructose corn syrup markets is specified and estimated. This model is then used to simulate the effect of alternative sugar policies on these two related markets. The simulations showed that our protective sugar policies have decreased the consumption of sugar substantially. According to the simulations, these policies have not led to the rapid growth in high fructose corn syrup, which apparently would have occurred anyway.

"The Common Sugar Policy of the European Community." Dale J. Leuck and Stephen Sposato, IED, ERS, USDA.

The sugar program of the European Community is of interest to Southern sugarcane producers because it has transformed the EC from a net importer of sugar in the mid-1970's to a net exporter which has supplied over 20 percent of the sugar traded on the world "free" market since 1980. A dual pricing system extends a high support price to an "A" quota, a lower support price to a "B" quota, and gives no support to sugar produced in excess of the "A" and "B" quotas. Price supports for sugar have been far above world levels, on average, and have risen more rapidly than price supports for grains.

"Automatic Adjusters and Farm Commodity Programs: The Case of Stock Triggers." James A. Zellner and J. Michael Price, IED, ERS, USDA.

Recent agricultural commodity legislation has contained provisions for automatic adjustment in support prices for dairy based on expenditures and removals and acreage reduction for grains and cotton based on ending stocks. Several alternative automatic adjustment mechanisms based on ending stocks were simulated for grains and cotton. Both acreage reduction and price support adjustments were made. Programs combining production and price adjustment were most successful in reducing stocks. Automatic adjusters may be successful for commodities where excess capacity is not severe. However, in cases such as wheat, where chronic excess capacity exists, such adjusters fail to achieve desired stock levels.

"The Impacts of Mexican Pricing Policies and Implications for U.S.-Mexican Trade." Nicole S. Ballenger, IED, ERS, USDA.

In this paper, one possible model for agricultural policy analysis in Mexico is presented. The model is unique because policies are treated as endogenous variables in a mathematical programming framework. The impacts of 'optimal' policy packages on Mexican agriculture and on trade are evaluated.

The results indicate that pricing policies can have important implications for the composition of Mexican agricultural production and trade. However, it does not appear that the policies considered in this research have major impacts on the supply and export of

Mexican fresh fruits and vegetables. Furthermore, grain imports most probably cannot be eliminated or even dramatically reduced with the use of these policy instruments alone.

FARM MANAGEMENT: ASSET COSTS, PURCHASE, AND REPLACEMENT (Ed Estes, North Carolina State University).

"Economics of Purchasing Genetically Superior Beef Bulls." Gregory M. Clary, Johnny W. Jordan, and Carl E. Thompson, Clemson University.

Net present value analysis is used to derive the marginal bid price for a beef herd sire from after-tax net revenues and cash flow influenced by genetic improvements. Marginal bid price represents the additional amount a producer could pay, above the present value of the current beef herd sire, for a sire expected to exhibit superior performance as reflected by increased average weaning weights of offsprings. An analysis of the profitability of purchasing a breeding bull for a commercial beef cow herd is presented as an application. Several alternative scenarios illustrate the impact of selected determinants on the marginal bid price of a bull.

"The Impact of Changing Tax Laws on Machinery Replacement Options." Clair J. Nixon and Larry VanTassell, Texas A & M University.

The decision to trade or sell equipment when purchasing new equipment was examined using a simulation model. Income and self-employment tax rates reflecting the current law were integrated into the model. The most profitable alternative prescribed is to sell, elect expensing, take the maximum investment tax credit, and use accelerated depreciation. The change in the optimum solution was also examined when various tax modeling methodologies were employed.

"Analysis of Factors Affecting Farm Machinery Cost Variability." Darrel D. Kletke and Scott M. Hininger, Oklahoma State University.

Numerous factors have considerable impact on per acre machinery costs including soil type, farm size, expected rainfall, wage rates, and timeliness required. A mixed integer linear programming algorithm is used to select optimal complements for a variety of farm situations. Changing from a sandy loam to clay loam soil has a great impact on costs because of increased draft requirements and fewer work days available due to increased water holding capacity. Requiring a higher level of timeliness results in the purchase of larger machines, decreased labor use, and increased per acre costs.

"Annual Decision Model for Machinery Replacement." John R. Allison and John J. Hanchar, University of Georgia.

In this paper, the development of a mathematical programming model for the purpose of annually reviewing the simultaneous aspects of farm machinery replacement policies is discussed. The linear programming model is described and its ability to analyze annual replacement decisions determined. The formulation of the model allows machinery replacement decisions to be made considering the current farm planning situation and average conditions expected in the future, while maximizing net income over time. Results indicate that a relatively small model can effectively examine the farm machinery replacement problem. In addition, gross farm income can affect the optimal replacement decision.

"Optimal Machinery Complement Selection for a Given Farm Organization in the Wiregrass Area, Alabama." Ebenezer F. Kolajo and Neil R. Martin, Jr., Auburn University.

Farm machinery management deserves much more attention in this era of cost-price squeeze conditions. Thus, optimal machinery complements were selected for three representative row-crop farm sizes in Alabama, using a mixed integer programming model. The model was constrained by labor status, weather conditions, and farm size. Results of the model indicate that seasonal labor along with small-size machinery complements are more efficiently utilized than fulltime hired labor. Incorporating weather risks into machinery decisions might exaggerate machinery requirements. Farm size expansion is a function of large machinery complements, with the converse not being true. Results, in general, reflect the prevalence of excess machinery capacity in the study area.

PROFESSIONAL ISSUES IN EDUCATION AND RESEARCH (Eric Wailes, University of Arkansas).

"Farmers' Knowledge and Use of Financial Management Practices and Computers." Larry VanTassell, Ronald D. Kay, and Rod Martin, Texas A & M University.

Inflationary stresses and high interest rates have amplified the importance of financial management for today's farm operators. Enterprise, partial, and cashflow budgets along with balance sheets and inventories represent some of the financial tools available for financial control, planning, and decisionmaking. In this paper, the extent of Texas farm operators' knowledge and use of these five financial tools are examined using data from a statewide survey. The implementation and use of computers in the financial management process are also addressed.

"Agricultural Software Development—Private Vs. Public." Lawrence A. Lippke, Texas A & M University.

Involvement by land-grant institutions in microcomputer software development for agricultural applications is currently a topic of much controversy. Some have expressed the opinion that this is a private sector responsibility. The solution of this controversy possibly rests in the nature of the software in terms of whether it is a public or private good, or whether this software is educational material. An analysis of types of software in agriculture is conducted to determine to what extent this software might be a public or private good using pre-established criteria for defining these two terms.

"Educational Expenditures and Human Capital Accumulation." Kevin T. McNamara and Brady J. Deaton, Virginia Polytechnic Institute and State University.

This paper analyzes the relationship between standardized achievement test scores, the most commonly used education output measure, and per pupil expenditure measures. An education production model that incorporates a lag period in the measurement of output is developed and estimated. The results, which support the use of a lag structure in measuring returns to inputs into education production, raise questions about the interpretation of prior research that has generally ignored the dynamic nature of education production and the application of this research to educational policy.

"Returns to Post-Harvest Research: An Application to the Florida Citrus Processing Sector." Harriet Stranahan, J. S. Shonkwiler, and M. R. Langham, University of Florida.

Evaluation of agricultural research has generally focused on the effects of biological or technological improvements in production. However, post-harvest research in the food industries often is an integral factor affecting demand growth, marketing methods, and the efficient utilization of perishable food resources. This study analyzes the effects of post-harvest research on the Florida citrus processing subsector using a translog cost function. It is shown that expenditures allocated to research have a high rate of return and the findings support the existence of research induced factor bias.

"Why Should a State Fund Agricultural Research and Education?" George W. Norton and G. Andrew Bernat, Virginia Polytechnic Institute and State University.

Agricultural economists are frequently asked by college administrators to provide information supporting requests to the state legislature for research, extension, and teaching (RET) funding. An example is presented which shows how production function results can be used in an input-output analysis to calculate the state-wide impacts of RET expenditures. An input-output model of Virginia, adjusted to reflect the production changes due to RET, is used to estimate the effect on agricultural output, non-agricultural output, employment, household income, and gross state product of these expenditures.

MARKETING: ISSUES IN TRANSPORTATION AND INTERREGIONAL COMPETITION (Jeff Jordan, Georgia Agricultural Experiment Station).

"Upgrading Country Elevators and Contracting for Rail Freight Services in the South Plains." Stephen Fuller and Hector Viscencio, Texas A & M University; and Larry Makus, Oklahoma State University.

https://doi.org/10.1017/S0081305200017210 Published online by Cambridge University Press

Contracts between shippers and rail carriers were legalized by the Staggers Rail Act of 1980. Many contracts between grain shippers and rail carriers involve multiple car shipments in exchange for lower rates. Unfortunately, many country elevators in the Plains are not capable of making multiple carload shipments for which significant rate reductions may be offered. This study focuses on the Plains region and evaluates the economic feasibility of upgrading country elevators to make multi-car shipments in order to facilitate contracting at reduced rate levels.

"The South's Comparative Advantage in Broiler Production, Processing, and Distribution." Edward H. Easterling, NED, ERS, USDA; Curtis H. Braschler, University of Missouri; and John A. Kuehn, USDA, University of Missouri.

A linear programming model is applied for analyzing present and potential sites for broiler industry location, with an objective to minimize aggregate costs. Little difference is found in the optimal location pattern and the current situation. Alabama is the most favored location in the Southern States. California is projected to increase production due to lower rail rates for unit train delivery of feedstuffs. The Midwest is not judged to be a viable location.

"Optimizing Net Returns for Two Meat Processing Plants in Alabama: A Case Study Approach." H. Mary Cox and Gregory M. Sullivan, Auburn University.

The Southeastern meat packing industry faces problems in its attempts to compete with packers from other regions. Excess plant capacity exists in the region because of cost inefficiencies in purchase, slaughter, and processing of red meat animals compared to packing plants outside the region. A linear programming model is developed to aid in management decisions for meat packers in the Southeast. A model is constructed using cost and price data as well as production data for the two types of hog processing plants. The results of the model indicate how net returns could be increased through changes in the marketing mix of products and reallocation of labor.

"The Impact of Changes in Transportation Rates, Grain Production, and Export Demand on Net Farm Incomes." Patricia E. McLean, Southern University.

A constrained multi-product optimization model is developed to determine equilibrium corn, soybean, and wheat prices in three export markets and the flow of grain from five origins in Ohio to export and domestic demand centers. Sensitivity tests are conducted to derive the effects of changes in transportation rates, demand, and supplies on farm incomes. The MINOS technique solves this non-linear programming problem in an effective and efficient way.

"Interregional Competition in Soybean Processing in the 1990s." Gerard E. D'Souza, West Virginia University; and Travis D. Phillips, Mississippi State University.

A transshipment model was constructed to simulate the spatial organization of the U.S. soybean processing industry. Analyses of model results for various time periods indicate that a structural and locational metamorphosis is needed for the system to approach optimality. The suggested reorganization could provide guidelines to enable the system to transcend from the existing inefficient plateau to a configuration that is more consistent with maximizing the gains from processors' regional comparative advantages. Both industry planners and policymakers can benefit from the implications portrayed by this study.

EVALUATING FARM INPUTS AND ENTERPRISES (John Van Sickle, University of Florida).

"Supply Response of Sorghum for Energy Conversion: Texas Lower Rio Grande Valley." Paul W. Teague and Ronald D. Lacewell, Texas A & M University.

Since the 1973 oil crisis, many studies have investigated using biomass residue from crops as an alternative, renewable source of energy. Sorghum is particularly suited to many of these processes due to the high concentration of convertible solids contained in some varieties. This paper investigates the quantity of such sorghums that would be supplied by the Texas Lower Rio Grande Valley (LRGV) at alternative price levels. A linear programming MOTAD model which simulates optimal cropping patterns under risk in the LRGV is used to determine the price of biomass re-

quired for it to be competitive as a crop alternative in the wide range of cropping pattern options available to producers in the LRGV. The sensitivity of this supply response is also analyzed at different levels of risk imposed by the model.

"Optimal Irrigation Pivot Location on Irregularly Shaped Fields." L. Upton Hatch, William E. Hardy, Jr., Eugene W. Rochester, and Gregory C. Johnson, Auburn University.

Selection of the optimal position, size, and number of pivots in a center pivot irrigation system poses special problems on small, irregularly shaped fields. In the Southeastern United States, field size and shape are often varied and irregular. Irrigation technology is rapidly being adopted; however, most research on center pivot irrigation systems has focused on large regularly shaped fields. Farmers in the Southeast require production information concerning the efficient use of irrigation technology adapted to regional growing conditions. A linear programming model was constructed to determine the optimal number of pivots and their optimal size and location.

"Incorporating Multiple Decision Criteria in an Assessment of Optimal South Carolina Irrigated/Nonirrigated Row Crop Farm Plans: A Goal Programming Approach." James L. Novak, Texas A & M University; and Larry L. Bauer, Clemson University.

Goal programming was used to evaluate the effect of changing hierarchial goal structures on optimal farm plans and on the decision of farm managers to irrigate field crops. The eight goal structures modeled were risk minimization, leisure underachievement, under- or over-use of the land base, net revenue underattainment, net worth underattainment, overuse of borrowed capital, overachievement of tax burden, and underattainment of maximum yield. This study illustrated the potential value of goal programming, but further research is needed on the application of goal programming to farm management problems.

"Development of Breakeven Analysis for Use in Short Duration Grazing System Investment Decisions." P. J. Chamberlain and J. Richard Conner, Texas A & M University.

Short duration grazing is a relatively new management technique. The outcomes associated with implementation of this approach are uncertain; i.e., the impact of adoption of the technique upon net returns is not guaranteed to be positive. This paper addresses the effects of changes in prices and conception rates upon breakeven stocking rates, based on a methodological development of a breakeven analysis. Both breakeven levels of stocking rates and added net returns to land, management and profit are found to be highly sensitive to (small) changes in prices and conception rates.

"On-Farm Value of Improved Irrigation Efficiency from an Exhaustible Groundwater Source." John G. Lee, John R. Ellis, and Ronald D. Lacewell, Texas A & M University.

This paper estimates, via a recursive linear programming model, the net benefits of improving irrigation application efficiency from an exhaustible groundwater source. Net benefits were derived for different application efficiency levels under furrow, sprinkler, and LEPA irrigation systems. In addition, net benefit estimates were obtained for the transition across irrigation systems. Solutions from the model indicate that low crop prices have a differential impact on net benefits across irrigation application efficiencies and irrigation systems and low groundwater levels consistently reduce the economic incentive to adopt improved irrigation application techniques across all irrigation systems.

MARKET AND PRICE ESTIMATION (Steve Fuller, Clemson University).

"The Impact of Federal Reserve Monetary Policy on Wood Product Futures." Fred E. Williams, Louisiana State University.

The Federal Reserve policy change of October 1979 strongly affected futures markets for wood products. Seasonal factors became less important under the stable money growth policy. The correlation between lumber and GNMA futures changed to positive, and a significant negative correlation developed between GNMA and plywood futures. The ability to statistically "explain" plywood futures prices declined after the policy change as did the importance of some variables.

"Temporal Allocation Alternatives for Southeastern Red Delicious Apples." L. R. Motsinger, University of Illinois; and J. E. Epperson and W. O. Mizelle, Jr., University of Georgia.

This study examined the economic feasibility of storing southeastern Red Delicious apples under various circumstances. Circumstances encompassed type of storage, potential market share in the storage period, perceived level of quality, and opportunity cost of storage. Reactive programming was used to allocate shipments throughout the harvest and storage periods. Except for apples harvested in August, storage was found to be economically feasible under all situations studied. The greatest economic benefit to producers was shown to come from the synergistic effect of storage and improvement in perceived quality.

"An Econometric Analysis of World Coffee Prices: 1960-1980." Steven E. Kraft and Ignacio Jose Fernandez, Southern Illinois University.

A single-equation, additive model was used to study the effects of various factors on world coffee prices. Statistically significant variables were total coffee supply, coffee prices lagged 6 years, and the price of tea. Using turning point analysis, the model was found to be a successful predictor. Additionally, evaluation of the hypothesis that the 1975 frost in Brazil had resulted in structural changes in the international coffee economy was accepted, based on the Chow test.

"Regulating Rural Electric Cooperatives' Utility Rate Levels: A Cross Sectional Analysis of Alternative Regulatory Institutions." Ralph D. Christy, Louisiana State University.

The objective of this paper was to examine the effectiveness of state regulatory commissions in influencing the average price per mega watt hour (MWH) paid by the member-customers of rural electric cooperatives (REC). To test the effect of regulation on utility rate levels, the regulatory treatment of RECs was expressed as a binary variable within a regression model. A group of 332 RECs operating in 14 Southern States was examined for the years 1970, 1975, and 1980. The results suggest the public service regulation is not a major factor associated with lower average rates of southern rural electric cooperatives.

"A Rational Expectations Model of the Soybean Market." Suchada V. Langley, University of Maryland.

This paper investigates and utilizes the idea of rational expectations in an econometric and time series model. Dynamic optimization procedures are formulated for a representative producer and consumer. The optimum decision rules are derived from the optimization processes. The model is then applied to quarterly soybean data. This approach to econometric modeling provides rich information which is not contained in the conventional *ad hoc* econometric practice.